CLAIMS

1.- Operating method for a convertible aircraft (1), equipped with a fuselage (2), standard fixed wings (3) with ailerons, a tail unit (4) with rudders (20), propulsion engines (5), a rotor (6) with blades (7, 8), a transmission between the engines and the rotor, equipped with braking (21) and clutch means (22), a landing gear (9), **characterised in that** that the method comprises a direct and reverse transition from helicopter mode to gyroplane mode and a direct and reverse transition from gyroplane-helicopter mode to aeroplane mode, the direct transition from helicopter mode to gyroplane mode comprising the following stages:

declutching the rotor from the rotor's propulsion engines,

and the direct transition from gyroplane-helicopter mode to aeroplane mode comprising the following stages:

adjusting the collective and cyclic pitches of the blades (7, 8) of the rotor (6) to essentially zero degrees, in such a way that they cease to lift and control the aircraft (1) and the latter is lifted and controlled by the ailerons and the rudders (20);

quickly reducing the rotational velocity of the rotor (6) using the brake thereof;

stopping the rotor in a transverse position of at least two of its blades (7, 8) in a position essentially transverse to the direction of flight;

retracting the rotor blades towards the stern of the aircraft, until their longitudinal axis is aligned with the direction opposite that of the aircraft's movement;

rotating at least one of the rotor blades to approximately 180° on its pitch axis;

deploying the rotating blades, independently from one another, to an azimuthal position determined by a pre-determined range of angles; and

adjusting the angle of attack of the deployed rotating blades in such a way that they are placed on the aircraft's standard fixed wings,

and the reverse transition comprising the steps above executed in reverse sequence and with the opposite actions.

2.- Method, according to claim 1, characterised in that the direct transition comprises the preliminary step of retracting the landing gear (9).

3.- Method, according to any of the preceding claims, characterised in that it comprises the step of operating the aircraft's pressurisation and heating systems (1).

4.- Method, according to any one of the preceding claims, characterised in that it comprises the step of rising to an optimal flight altitude pre-determined on the basis of the atmospheric conditions and air traffic control.

5.- Method, according to claim 1, characterised in that said pre-determined range of angles is preferably between 30 and 90º.

6.- Method, according to claim 1, characterised in that said step of adjusting the angle of attack of the deployed rotating blades (7, 8), in such a way that they are placed on the aircraft's standard fixed wings (3), comprises arranging the blades in the form of a biplane with respect to the standard wings.

7.- Convertible aircraft (1), of the type that comprises a fuselage (2), fixed wings (3) with ailerons, a tail unit (4) with rudders (20), propulsion engines (5), a rotor (6) with blades (7, 8), a transmission between the engines and the rotor, equipped with braking and rotor clutch means, landing gear and transition means from helicopter mode to gyroplane mode and vice versa, **characterised in that** the rotor is equipped with driving means for the direct and reverse transition (17, 18) from gyroplane-helicopter mode to aeroplane mode, which comprise:

an engine (18) for the regulation of the collective and cyclic pitches of the blades (7, 8) of the rotor (6) to essentially zero degrees, in such a way that they cease to lift and control the aircraft (1) and the latter is lifted and controlled by the ailerons and the rudders (20);

means to stop the stop the rotor in a transverse position of the blades (7, 8) in a position essentially transverse to the direction of flight;

an engine (17) to retract and deploy the rotor blades towards and from the stern of the aircraft, which allows to retract the blades until their longitudinal axis is aligned with the direction opposite that of the aircraft's movement, and deploy them to an azimuthal position determined by a pre-determined range of angles; and

an engine (17) to rotate at least one of the rotor blades to approximately 180º on its pitch axis.

8.- Convertible aircraft (1), according to claim 7, characterised in that it comprises a control system for the various stages of the different transitions, the aircraft's control system being free of manipulatable mechanical elements between the control levers and the aircraft's control elements.

9.- Convertible aircraft (1), according to claim 8, characterised in that it comprises programming and automation means for the various stages of the different transitions, in such a way that they are programmable and automatically executed.

10.- Convertible aircraft (1), according to claim 9, characterised in that the control system comprises redundant safety elements.

11.- Convertible aircraft (1), according to claim 10, characterised in that said redundant safety elements are redundant computers, sensors and actuators.

12.- Convertible aircraft (1), according to any of claims 8 to 11, characterised in that said automatic control system is a system of the "Fly-by-wire" or "x-by-wire" type.

13.- Convertible aircraft (1), according to any of claims 7 to 12, characterised in that the blades (7, 8) of the rotor (6) have a symmetric aerodynamic profile with respect to the chord of the blade's aerodynamic profile.

14.- Convertible aircraft (1), according to claim 13, characterised in that the ratio between the thickness and the chord of the blades' (7,8) aerodynamic profile is between 0.1 and 0.2.

15. - Convertible aircraft (1), according to any of claims 7 to 14, characterised in that the blades (7, 8) of the rotor (6) are designed in such a way that the chord at the root is greater than the chord at the tips.

16.- Convertible aircraft (1), according to 7 to 15, characterised in that said propulsion engines (5) are engines with propellers (11).

17.- Convertible aircraft (1), according to claim 16, characterised in that the propellers (11) are placed on the stern with respect to the standard fixed wings (3).

18.- Convertible aircraft (1), according to claims 16 or 17, characterised in that said propellers (11) have a variable pitch.

19.- Convertible aircraft (1), according to any one of claims 7 to 18, characterised in that said propulsion engines (5) are piston, gas turbine or jet engines.